

PROPERTY PLANNING COMMON ELEMENTS

COMPONENTS OF MASTER PLANS

HABITATS AND THEIR MANAGEMENT

Intermediate Treatments

Description

There are a variety of intermediate treatments that can be applied to forest stands after regeneration is established and carried out throughout the life of the stand. These “tending” treatments are intended to enhance stand composition, structure, growth, health, quality, and production of specific desired benefits. These treatments can be non-commercial (i.e., do not involve the sale of harvested materials) or commercial. “Timber stand improvement” (TSI) is a commonly applied term that refers to non-commercial intermediate treatments.

Intermediate treatments include release, thinning, improvement cutting, salvage and sanitation cutting, and pruning. These are described below.

Release

This is a treatment designed to free young trees (seedlings and saplings) from undesirable, usually overtopping, competition. The purpose is to regulate species composition and improve growth and quality by providing potential crop trees with sufficient light and growing space, freeing their crowns, and controlling competition. **Complete release** refers to the release of an entire layer of vegetation to allow the desired species to gain dominance (e.g., control of competing red maple stump sprouts after establishment of oak seedlings following a shelterwood harvest). **Partial release** involves the release of only selected trees, usually well-spaced, healthy, vigorous crop trees, by removing direct competitors – trees with crowns that touch or interfere with crop trees, or the best one or two stems in a sprout clump. In general, release treatments should be implemented early in the life of a stand (typically before 15 years of age).

There are three types of release treatments – weeding, cleaning, and liberation – distinguished by the type, age, and size of vegetation to be eliminated. They can be applied individually or in concert, once or multiple times within a stand.

- **Weeding** is the elimination or suppression of undesirable vegetation (including shrubs and herbs) regardless of crown position.
- **Cleaning** is the removal of less desirable individuals (trees) of the same age class that currently overtop favored crop trees or are likely to do so.
- **Liberation** refers to the removal of older, less desirable trees that are currently overtopping favored crop trees.

Thinning

Thinning is a treatment conducted in stands that are past the sapling stage, and is designed to improve growth, enhance forest health, or recover potential mortality. Typically, it entails the removal of trees to temporarily



reduce stocking so as to concentrate growth on the more desirable trees. Thinning impacts stand growth, structure, and development, and increases economic yields. How and when thinnings are applied depends on various factors, including ecological (site quality, species composition, stand condition and structure), economic (costs and benefits, local markets), and social (regulations, aesthetics) considerations and other past or planned management activities. A thinning schedule for a stand should identify the method, intensity, and timing of thinnings to be applied.

There are four basic methods of thinning. Stand conditions and thinning needs vary over time, often resulting in application of more than one method over the life of a stand. The four methods – mechanical thinning, low thinning, crown thinning, and free thinning – are described below.

- **Mechanical thinning** is the removal of trees in rows, strips, or by using fixed spacing intervals. This is often applied in young, densely crowded or relatively uniform stands. Row thinning often is used for the first thinning(s) in plantations where rows are readily apparent, while spacing thinning is used in stands developed from dense natural reproduction.
- **Low thinning**, also called “thinning from below”, involves removal of trees from the lower crown classes (i.e., intermediate and overtopped trees) to favor trees in the upper crown classes (dominant and co-dominant trees). This method accelerates and somewhat simulates the natural elimination of the lower crown classes through competition. Light- to medium-intensity low thinnings remove suppressed and intermediate trees, while heavy low thinnings involve removal of some co-dominant trees to create canopy openings and release crowns of crop trees.
- **Crown thinning**, also called “high thinning” or “thinning from above”, involves the removal of trees from the dominant or co-dominant crown classes in order to favor the best trees in those same crown classes. Large trees in the intermediate class that interfere with crop trees can also be removed. Crown thinnings often are conducted as commercial operations, as they involve the removal of relatively large trees. Crown thinnings are recommended for developing and managing quality hardwoods for sawtimber and veneer logs, and are most applicable to stands of shade-tolerant or mixed species. When applied to stands of shade-intolerant or mid-tolerant species, alternating crown thinnings with low thinnings may be preferable.
- **Free thinning** is the removal of trees to control stand density and favor crop trees using a variety of criteria without strict regard to crown position. This method typically is a combination of concepts and techniques from both low and crown thinning methods. Free thinning is recommended to manage quality hardwood stands for the production of high value sawtimber and veneer logs, and requires considerable skill in tree selection and density management to be most effective.

Improvement Cutting

Improvement cutting is the removal of less desirable trees of any species in a stand of pole-sized or larger trees, primarily to improve composition and quality. Trees are removed to encourage the growth of more desirable trees within or below the main canopy. Trees considered for removal include undesirable species, trees of poor vigor or quality, and injured or unhealthy trees (risk). Potential crop trees should be preferred species and relatively well formed, vigorous, and healthy. Improvement cutting is usually applied in stands that have been unmanaged, neglected, or poorly managed. Such stands may consist of many poor-quality trees of multiple size and age classes resulting from past abuses such as high-grading. The intent is to remove undesirable material and set the stage for productive management. Improvement cuttings should be implemented as soon as possible where they are needed. In most cases, they can be completed in one to three operations. Improvement cuttings



can be commercial or non-commercial. In practice, improvement and thinning techniques often are combined during initial treatments.

Salvage and Sanitation Cuttings

In forests, at landscape scales and over long rotations, partial and catastrophic stand damage (e.g., windthrow or flooding from storms; wildfires; pest or disease outbreaks) is inevitable. **Salvage cutting** refers to the removal of dead, dying, or damaged trees resulting from injurious agents other than competition, to recover economic value that would otherwise be lost. Salvage operations are done for profit, with the intent of utilizing damaged trees and minimizing financial losses. The intensity of salvage operations depends on the severity of damage, accessibility, and potential economic losses. Where salvage is compatible with other management objectives for the area, salvage should be conducted as soon as possible following the damaging event. Dead trees deteriorate rapidly during the first spring and summer following their death. Deterioration varies by species, tree size, site quality, and type of damage. Severe stand damage will require the implementation of regeneration methods.

Before implementing salvage operations, consider management goals and objectives relative to wildlife and biodiversity. Large-diameter decaying trees, dying trees, snags, and downed coarse woody debris provide critical habitat for many organisms. Following severe stand disturbance, these structures can provide habitat that facilitates species perpetuation on site, re-colonization, dispersal, and landscape connectivity.

During salvage operations, consider retaining some unsalvaged patches at least one-tenth of an acre in size to provide habitat structure. These patches should include large-diameter reserve trees, mast trees, cavity trees, snags, and downed coarse woody debris if present. Unsalvaged patches can often be located to complement multiple management objectives and stand conditions; such as the protection of critical areas, riparian management zones, travel corridors, or areas with poor logging access. Many salvage operations will contain significant unsalvaged patches simply due to the operational constraints of working in severely disturbed stands. The extent and distribution of unsalvaged patches may need to be modified if retention would interfere with effective sanitation methods to control insect and disease outbreaks or be deemed a threat to human health and safety (e.g., risk of wildfire).

Sanitation cutting is the removal of trees to improve stand health by stopping or reducing the actual or anticipated spread of insects or disease (e.g., pine bark beetle; oak wilt). It is precautionary protection implemented to reduce the spread of damaging organisms or in anticipation of attacks to prevent or delay the establishment of damaging organisms. Sanitation cuttings eliminate trees that are current or prospective sources of infection for insects or fungi that might attack other trees. The removal of trees must actually interrupt the life cycle of the organisms sufficiently to reduce or prevent their spread to other trees.

Pruning

Pruning is the removal, close to the branch collar or flush with the stem, of side branches and multiple leaders from a standing tree, typically applied to improve timber quality and value. Lateral pruning removes branches that form knots, a common defect which reduces timber value. Corrective pruning removes multiple leaders to improve stem form. Pruning also can be applied to control disease or improve aesthetics or accessibility. Pruning is expensive and typically used only for the best quality crop trees on good sites. It is most commonly applied to conifer plantations, for species that are poor natural pruners (e.g., red and white pine) but for which pruning can significantly increase value.



Considerations

Intermediate treatments can affect timber productivity, stand structure, wildlife habitat, species and habitat diversity, aesthetics, water quality, and soil condition. Careful consideration should be given to ramifications of a planned treatment.

- Clarify objectives, specifications, regulations, and site limitations prior to implementing operations.
- Identify crop tree management objectives, characteristics, and spacing.
- Logging residues (slash) and stumps can facilitate infestations in some cases, and may require treatment. Timing of cutting should consider disease and insect cycles.
- Evaluate soil conditions and control heavy equipment operations to limit compaction, rutting, and erosion.
- Evaluate the need for additional slash control measures or seasonal operating restrictions to mitigate visual impacts.
- Identify occurrences of invasive species and treat infestations prior to conducting activities to help prevent spread.
- Consider where complimentary retention (large trees; snags; dead or dying trees; living or dead cavity trees; dead branches on live trees, etc.) may provide structural diversity and wildlife habitat.

